

Serial No..09/401,408

Attorney Docket: 2455-4628

Demand for wireless voice and data communications continues growing in all aspects of life and will soon lead to a diverse and complex mixture of cells, found in the most unpredictable RF propagation environments. Such cells may exist in layered configurations that enable greater re-use of the RF spectrum and provide continuity of communication between the cell layers. RF planning for such systems is difficult to do manually. In addition to the planning complexity, the cost of manual RF planning becomes a more substantial portion of wireless communication costs as the cost for base stations of the Wireless Centrex Service decreases. Ideally, one would want wireless systems that can self configure, and layered configurations that involve no elaborate planning and coordination of RF use between cell layers.

Page 5, second paragraph (lines 10-41), REPLACE as follows:

Channels are assigned to adjunct cells from the interference-free set. The interference-free channels left unassigned serve as back-up channels in case the assigned channels turn noisy. Channel use within the adjunct system leads to different spectrum monitoring procedures during different system phases. During system initialization -- a brief self-calibration phase that requires no human participation -- there are no calls served and, consequently, the users of a channel lie entirely outside the system. During system operation, when the adjunct base stations and mobile units are transmitting, signals on a channels may be generated both inside and outside the adjunct system. In this phase, the spectrum-monitoring procedure employed depends on whether the monitored channel is used by the adjunct system. We refer to a channel used by the adjunct system as an *assigned* channel. The *non-assigned* channels include both noisy channels and interference-free channels that have been reserved for back-up purposes. Monitoring non-

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assigned channels maintains a pool of interference-free back-up channels. Monitoring assigned channels is necessary as interference on control channels causes loss of registered mobiles and prevents new mobile registrations, while interference on traffic channels degrades the quality of communication. Active assigned channels (channels bearing calls) are monitored through measurement of the serving signal strength and the bit-error rate. If a channel that enjoys a strong serving-signal experiences high bit-error rate, it is deemed noisy and is replaced by a back-up channel. If, on the other hand, a high bit-error rate is observed on a channel with a weak serving signal, a hand-off is requested. Inactive assigned channels (channels bearing no calls) are replaced periodically by back-up channels, which are monitored as non-assigned channels. We will not deal with spectrum monitoring of assigned channels further in this specification. Our subsequent discussion pertains only to monitoring non-assigned channels during system operation and all channels during system initialization. In this specification, interference from sources outside the adjunct system is attributed either to background noise, or to the selective use of channels by the base stations and mobiles of the primary system in the vicinity of the monitoring adjunct system. For simplicity, we will assume that the background noise exhibits no random variation. Thus, when the background noise is strong, a single measurement suffices to establish the status of a channel. When, on the other hand, the background noise is low, one must deduce the likelihood of experiencing interference in the future from the channel's past utilization in nearby cells of the primary system. The problem thus becomes to determine from signal strength measurements, serving as proxies for channel-use data, the likelihood that a channel will carry primary system traffic in the vicinity of the adjunct system.

Page 7, third paragraph (lines 20-27), REPLACE as follows:

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The objective during system initialization is to complete the classification of all channels in the shortest possible time so that operation may start. Since the base stations serve no calls, they are available to engage in spectrum monitoring measurements when and as needed. Measurements can thus be made at pre-specified time intervals, which are set to give a statistical sample that conforms to the test-design objective and, at the same time, maintains an error probability below a specified level. The following section on initialization phase and Test design describes the design of the test employed during system initialization. Figure 2A shows the steps in the initialization state which includes the connection, initial calibration, and system optimization stages.

Page 8, second paragraph (lines 8-17) and fifth paragraph (lines 40-43), respectively, REPLACE as follows:

The objectives of spectrum monitoring in the two phases are different. The objective during system operation is to make as few measurements as possible because of the undesirable impact of long times off a radio's assigned channel, which would make it imprudent to engage a base station radio in spectrum monitoring excessively. Another difference relates to the random nature of the waiting times between consecutive measurements. Unlike measurements during system initialization, measurements during system operation cannot be made when and as needed; they must be made only when there are base stations and mobiles available to do so. the following section on operation and testing design describes the test employed during system operation. Figure 2B shows the steps of the learning phase which continues from the system optimization stage and begins the operation stage.

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The probability, p_E , associated with the false acceptance of the test hypothesis is the sum of the probabilities of two disjoint events: the probability p_0 that no calls will occur during the test, and the probability p_F that all the calls that occur during the test will fall between consecutive measurements. That is,

$$p_E = p_0 + p_F \quad (1)$$

Page 11 (lines 30-45), REPLACE as follows:

The test-design objective during system operation, namely, the minimization of the required number of measurements, is achieved in two different ways. First, by employing sequential analysis and, second, by selecting the target spacing between consecutive measurements on the same channel accordingly. The remainder of the specification deals with the sequential testing methods that may be employed during system operation. We present only tests involving simple arithmetic operations, in order to illustrate the versatility and ease of implementation of the proposed method for different equipment configurations.